SEQUENCE LISTING

<110> Wood, Keith

     Hannah, Rita

     Moravec, Richard A

<120> IMPROVED METHOD FOR DETECTION OF ATP

<130> 10743/6

<140> US 09/813,279

<141> 2001-03-19

<150> US60/269,526

<151> 2001-02-16

<160> 8

<170> PatentIn version 3.1

<210> 1

<211> 544

<212> PRT

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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Met Ala Asp Lys Asn Ile Leu Tyr Gly Pro Glu Pro Phe Tyr Pro Leu
1   5   10   15

Ala Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
          20   25   30

Ala Asp Ile Ser Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
        35   40   45

Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
        50   55   60

Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65   70   75   80

Ser Glu Asn Gly Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
                85   90   95

Leu Gly Ile Ile Ala Ala Pro Val Ser Asp Lys Tyr Ile Glu Arg Glu
            100   105   110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Ile Phe Cys Ser
        115   120   125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
        130   135   140

Val Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145   150   155   160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
                165   170   175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
            180   185   190

Leu Val Met Phe Ser Ser Gly Thr Thr Gly Val Pro Lys Gly Val Met
        195   200   205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Leu Ala Lys Asp Pro
210   215   220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Thr Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
            245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
            260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
        275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
               325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
               340   345   350

Lys Gly Asp Ala Arg Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
           355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
       370   375   380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Ala Met Ile Met Lys Gly Tyr
385   390   395   400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
               405   410   415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
               420   425   430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
           435   440   445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
       450   455   460

Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465   470   475   480

Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
               485   490   495

Val Gln Asp Phe Val Ser Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
               500   505   510

Gly Gly Val Lys Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
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Ile Asp Arg Lys Val Leu Arg Gln Met Phe Glu Lys His Thr Asn Gly

<210> 2

<211> 544

<212> PRT

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 2

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Glu Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
            20              25              30


Ala Asp Ile Pro Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
            35              40              45


Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
        50              55              60


Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65              70              75              80


Ser Glu Asn Gly Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
            85              90              95


Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
            100             105             110


Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
        115             120             125


Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
        130             135             140


Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145             150             155             160


Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
            165             170             175
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Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
        180   185   190

Leu Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
        195   200   205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Leu Ala Lys Asp Pro
    210   215   220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Thr Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
                245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
                260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
        275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
    290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
                325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
                340   345   350

Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
            355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
    370   375   380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
385   390   395   400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
                405   410   415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420   425   430

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Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
        435                 440                 445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
        450                 455                 460

Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465                 470                 475                 480

Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
                485                 490                 495

Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
            500                 505                 510

Gly Gly Val Lys Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
        515                 520                 525

Ile Asp Arg Lys Val Leu Arg Gln Met Phe Glu Lys His Thr Asn Gly
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<210> 3

<211> 544

<212> PRT

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 3

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Met Ala Asp Lys Asn Ile Leu Tyr Gly Pro Glu Pro Phe Tyr Pro Leu
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Glu Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
                20                  25                  30

Ala Asp Ile Pro Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
        35                  40                  45

Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
    50                  55                  60

Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65                  70                  75                  80
```

Ser Glu Asn Ser Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
                85   90   95

Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
            100   105   110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
        115   120   125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
    130   135   140

Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Asp Asp Leu Gly Gly Tyr
145   150   155   160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
            165   170   175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
            180   185   190

Leu Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
            195   200   205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Ile Ala Lys Asp Pro
    210   215   220

Thr Phe Gly Asn Ala Ile Asn Pro Thr Ser Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
            245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
            260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
            275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
    290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg

325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
            340   345   350

Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Phe His
            355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
    370   375   380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
385   390   395   400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
                405   410   415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420   425   430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
            435   440   445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
    450   455   460

Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465   470   475   480

Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
                485   490   495

Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
            500   505   510

Gly Gly Val Ile Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
            515   520   525

Ile Asp Arg Lys Val Leu Arg Gln Met Leu Glu Lys His Thr Asn Gly
    530   535   540

<210>   4

<211>   544

<212>   PRT

<213>   Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

<400> 4

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Glu Asp Gly Thr Ala Gly Glu Gln Met Phe Asp Ala Leu Ser Arg Tyr
            20                  25                  30

Ala Ala Ile Pro Gly Cys Ile Ala Leu Thr Asn Ala His Thr Lys Glu
        35                  40                  45

Asn Val Leu Tyr Glu Glu Phe Leu Lys Leu Ser Cys Arg Leu Ala Glu
    50                  55                  60

Ser Phe Lys Lys Tyr Gly Leu Lys Gln Asn Asp Thr Ile Ala Val Cys
65                  70                  75                  80

Ser Glu Asn Ser Leu Gln Phe Phe Leu Pro Val Ile Ala Ser Leu Tyr
                85                  90                  95

Leu Gly Ile Ile Val Ala Pro Val Asn Asp Lys Tyr Ile Glu Arg Glu
            100                 105                 110

Leu Ile His Ser Leu Gly Ile Val Lys Pro Arg Ile Val Phe Cys Ser
        115                 120                 125

Lys Asn Thr Phe Gln Lys Val Leu Asn Val Lys Ser Lys Leu Lys Ser
    130                 135                 140

Ile Glu Thr Ile Ile Ile Leu Asp Leu Asn Glu Asp Leu Gly Gly Tyr
145                 150                 155                 160

Gln Cys Leu Asn Asn Phe Ile Ser Gln Asn Ser Asp Ser Asn Leu Asp
                165                 170                 175

Val Lys Lys Phe Lys Pro Tyr Ser Phe Asn Arg Asp Asp Gln Val Ala
            180                 185                 190

Ser Ile Met Phe Ser Ser Gly Thr Thr Gly Leu Pro Lys Gly Val Met
            195                 200                 205

Leu Thr His Lys Asn Ile Val Ala Arg Phe Ser Ile Ala Lys Asp Pro
    210                 215                 220
```

Thr Phe Gly Asn Ala Ile Asn Pro Thr Ser Ala Ile Leu Thr Val Ile
225   230   235   240

Pro Phe His His Gly Phe Gly Met Met Thr Thr Leu Gly Tyr Phe Thr
                245   250   255

Cys Gly Phe Arg Val Val Leu Met His Thr Phe Glu Glu Lys Leu Phe
            260   265   270

Leu Gln Ser Leu Gln Asp Tyr Lys Val Glu Ser Thr Leu Leu Val Pro
            275   280   285

Thr Leu Met Ala Phe Leu Ala Lys Ser Ala Leu Val Glu Lys Tyr Asp
    290   295   300

Leu Ser His Leu Lys Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser Lys
305   310   315   320

Glu Ile Gly Glu Met Val Lys Lys Arg Phe Lys Leu Asn Phe Val Arg
                325   330   335

Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Val Leu Ile Thr Pro
            340   345   350

Lys Gly Asp Ala Lys Pro Gly Ser Thr Gly Lys Ile Val Pro Leu His
            355   360   365

Ala Val Lys Val Val Asp Pro Thr Thr Gly Lys Ile Leu Gly Pro Asn
    370   375   380

Glu Pro Gly Glu Leu Tyr Phe Lys Gly Pro Met Ile Met Lys Gly Tyr
385   390   395   400

Tyr Asn Asn Glu Glu Ala Thr Lys Ala Ile Ile Asp Asn Asp Gly Trp
                405   410   415

Leu Arg Ser Gly Asp Ile Ala Tyr Tyr Asp Asn Asp Gly His Phe Tyr
            420   425   430

Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln Val
            435   440   445

Ala Pro Ala Glu Ile Glu Gly Ile Leu Leu Gln His Pro Tyr Ile Val
    450   455   460

Asp Ala Gly Val Thr Gly Ile Pro Asp Glu Ala Ala Gly Glu Leu Pro
465   470   475   480

```
Ala Ala Gly Val Val Val Gln Thr Gly Lys Tyr Leu Asn Glu Gln Ile
                485             490                 495


Val Gln Asp Tyr Val Ala Ser Gln Val Ser Thr Ala Lys Trp Leu Arg
            500                 505                 510


Gly Gly Val Lys Phe Leu Asp Glu Ile Pro Lys Gly Ser Thr Gly Lys
        515             520                 525


Ile Asp Arg Lys Val Leu Arg Gln Met Leu Glu Lys His Thr Asn Gly
    530             535                 540
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<210> 5

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttttaaaatt     180

gtcgtgtcgt ttagcggaaa gtttttaaaaa gtatggatta aaacaaaacg acacaatagc     240

ggtgtgtagc gaaaatggtt tgcaattttt ccttcctgta attgcatcat tgtatcttgg     300

aataattgca gcacctgtta gtgataaata cattgaacgt gaattaatac acagtcttgg     360

tattgtaaaa ccacgcataa tttttttgctc caagaatact tttcaaaaag tactgaatgt     420

aaaatctaaa ttaaaatctg tagaaactat tattatatta gacttaaatg aagacttagg     480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa     540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttggtaa tgtttttcttc     600

tggtacaact ggtgttccga agggagtcat gctaactcac aagaatattg ttgcacgatt     660

ttctcttgca aaagatccta cttttggtaa cgcaattaat cccacgacag caattttaac     720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg     780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga     840

ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaagtgc     900
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attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt      960

atcaaaagaa attggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg     1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccagacc     1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg     1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcgcca tgataatgaa     1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg     1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa     1320

gtcattaatt aaatataaag gttatcaggt tgcacctgct gaaattgagg gaatactctt     1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga     1440

gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca     1500

agattttgtt tccagtcaag tttcaacagc caaatggcta cgtggtgggg tgaaattttt     1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt     1620

tgaaaaacac accaatggg                                                  1639
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<210> 6

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact      180

gtcgtgtcgt ttagcggaaa gtttttaaaaa gtatggatta aaacaaaacg acacaatagc      240

ggtgtgtagc gaaaatggtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg      300

aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg      360

tattgtaaaa ccacgcatag ttttttgctc caagaatact tttcaaaaag tactgaatgt      420

aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg aagacttagg      480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa      540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttgatta tgttttcttc      600

tggtacaact ggtctgccga agggagtcat gctaactcac aagaatattg ttgcacgatt      660
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ttctcttgca aaagatccta cttttggtaa cgcaattaat cccacgacag caattttaac      720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg      780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga      840

ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaagtgc      900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt      960

atcaaaagaa attggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg     1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccaaacc     1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg     1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcccga tgataatgaa     1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg     1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa     1320

gtcactgatt aaatataaag gttatcaggt tgcacctgct gaaattgagg gaatactctt     1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga     1440

gcttccagct gcaggtgttg tagtacagac tggaaaatat ctaaacgaac aaatcgtaca     1500

agattatgtt gccagtcaag tttcaacagc caaatggcta cgtggtgggg tgaaattttt     1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt     1620

tgaaaaacac accaatggg                                                  1639
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<210> 7

<211> 1639

<212> DNA

<213> Artificial Sequence

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<223> Mutant of LucPpe2 luciferase

<400> 7

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catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact      180

gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc      240

ggtgtgtagc gaaaatagtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg      300

aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg      360
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tattgtaaaa ccacgcatag tttttttgctc caagaatact tttcaaaaag tactgaatgt      420

aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg atgacttagg      480

aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa      540

aaaatttaaa ccatattctt ttaatcgaga cgatcaggtt gcgttgatta tgtttttcttc      600

tggtacaact ggtctgccga agggagtcat gctaactcac aagaatattg ttgcacgatt      660

ttctattgca aaagatccta cttttggtaa cgcaattaat cccacgtcag caattttaac      720

ggtaatacct ttccaccatg gttttggtat gatgaccaca ttaggatact ttacttgtgg      780

attccgagtt gttctaatgc acacgtttga agaaaaacta tttctacaat cattacaaga      840

ttataaagtg gaaagtactt tacttgtacc aacattaatg gcatttcttg caaaaaagtgc      900

attagttgaa aagtacgatt tatcgcactt aaaagaaatt gcatctggtg gcgcaccttt      960

atcaaaagaa attgggggaga tggtgaaaaa acggtttaaa ttaaactttg tcaggcaagg     1020

gtatggatta acagaaacca cttcggctgt tttaattaca ccgaaaggtg acgccaaacc     1080

gggatcaact ggtaaaatag taccatttca cgctgttaaa gttgtcgatc ctacaacagg     1140

aaaaattttg gggccaaatg aacctggaga attgtatttt aaaggcccga tgataatgaa     1200

gggttattat aataatgaag aagctactaa agcaattatt gataatgacg gatggttgcg     1260

ctctggtgat attgcttatt atgacaatga tggccatttt tatattgtgg acaggctgaa     1320

gtcactgatt aaatataaag gttatcaggt tgcacctgct gaaattgagg gaatactctt     1380

acaacatccg tatattgttg atgccggcgt tactggtata ccggatgaag ccgcgggcga     1440

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agattatgtt gccagtcaag tttcaacagc caaatggcta cgtggtgggg tgatattttt     1560

ggatgaaatt cccaaaggat caactggaaa aattgacaga aaagtgttaa gacaaatgtt     1620

agaaaaacac accaatggg                                                   1639
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<210> 8

<211> 1639

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutant of LucPpe2 luciferase

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tgggacggct ggagaacaga tgtttgacgc attatctcgt tatgcagcta ttccgggctg      120
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catagcattg acaaatgctc atacaaaaga aaatgtttta tatgaagagt ttctgaaact    180
gtcgtgtcgt ttagcggaaa gttttaaaaa gtatggatta aaacaaaacg acacaatagc    240
ggtgtgtagc gaaaatagtc tgcaattttt ccttcctgta attgcatcat tgtatcttgg    300
aataattgtg gcacctgtta acgataaata cattgaacgt gaattaatac acagtcttgg    360
tattgtaaaa ccacgcatag tttttttgctc caagaatact tttcaaaaag tactgaatgt    420
aaaatctaaa ttaaaatcta ttgaaactat tattatatta gacttaaatg aagacttagg    480
aggttatcaa tgcctcaaca actttatttc tcaaaattcc gatagtaatc tggacgtaaa    540
aaaatttaaa ccctattctt ttaatcgaga cgatcaggtt gcgtcgatta tgttttcttc    600
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